IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. 047711-0295

In re patent application of

Wayne A. MORGAN, et al.

Group Art Unit: 2858

Serial No. 10/034,338

Examiner: Sundaram, T. R.

Filed: December 28, 2001

For: IMPLANTABLE SENSOR ELECTRODES AND ELECTRONIC CIRCUITRY

AMENDMENT AND REMARKS UNDER 37 C.F.R. § 1.111

Commissioner for Patents
Washington, D.C. 20231

Commissioner:

In reply to the Office Action mailed February 10, 2003, please amend the above-identified application as follows:

IN THE WRITTEN DESCRIPTION

The written description is amended by replacement of existing paragraphs with new paragraphs as follows:

On page 10, last paragraph:

The input latch 76 may feed a trim latch 78, an address matching circuit 80 and a channel latch 82. The channel latch 82 may comprise a plurality of latches with data inputs from the input latch 76. The channel latch 82 may be used to control prescalers and multiplexers. The trim latch 78 may also consist of a plurality of latches. Inputs to the trim latch 78 may contain trim ~~sitting~~ setting data. Once latched, the trim ~~sitting~~ setting may be maintained until the next trim setting operation or until a power-on reset occurs.

On page 12, first paragraph:

A temperature sensor 90 may be fed into the analog multiplexer 86 providing an output current that is a function of temperature. According to an embodiment of the present invention, nominal output current from the temperature sensor 90 may be 50 nanoamps and may change by 1 nanoamp per degree Celsius. Because some physiological parameter sensing applications are temperature dependent, such as, for example, a glucose oxygen reaction, precise calibration of the electronic circuitry depends on the temperature of the environment in which the electronic circuit is located, such as, for example, the human body. Therefore, the temperature sensor 90 may be included in the electronic circuit to provide proper calibration of the electronic circuit. For example, a patient with a fever may cause a different glucose/oxygen reaction than a patient with a normal body temperature. The temperature sensor 90 may be used to compensate for this difference.

On page 12, last full paragraph:

The current-to-frequency 92, 94, 96 converters may be calibrated in a variety of ways. According to an embodiment of the present invention, the current-to-frequency 92, 94, 96 converters may <u>be</u> calibrated at about 100 counts/sec/nanoamp. The calibration of the current-to-frequency 92, 94, 96 converters may depend on a variety of factors including, without limitation, the length of the counting time and any current-to-frequency <u>conversion factors.</u>

On pages 14, last paragraph:

Figure 8 shows an electrode side of a sensor substrate 120 used with the spacers 130 according to an embodiment of the present invention. The embodiment shown in Figure 8 may be used for physiological parameter sensing such as, for example, glucose sensing in the human body. The spacer 130 may be placed on top of the electrodes 40, 42, 44, 46, 48. If the spacer 130 is made of silicon, for example, the spacer 130 may pass oxygen but will not pass glucose. A glucose oxidase enzyme may be placed in the indentation 132 of the spacer 130, thereby resting over a second counter electrode-working electrode pair 42, 46. Oxygen passing through the silicon spacer 130 and reacting with a first counter electrode-working electrode pair 40, 44 may be read by the current-to-frequency converters and used to establish a reference amount of oxygen in the blood. Glucose reacting with the glucose oxidase enzyme seated over the second counter electrode-working electrode pair 42, 46 will tend to use up oxygen, leaving less oxygen available for reaction with the second counter electrode-working electrode pair 42, 46. Nonetheless, the remaining amount of oxygen will still react with the second counter electrode-working electrode pair 42, 46, and this value may be read by the current-to-frequency converter to which it is connected. The values out of each current-to-frequency ~~to~~ converter may be read and the differing amounts of oxygen may be used to determine the amount of glucose

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in the blood. The amount of glucose in the blood may be used to automatically deliver insulin to a patient using an implantable pump or other device.